

Att'y Ref. No. 003-125

U.S. App. No.: 10/808,491

1. (Previously Presented) A power generation plant comprising:
at least one gas turbine cycle including a heat-recovery boiler and at least one steam turbine cycle in communication with the heat-recovery boiler, the gas turbine cycle being semi-closed and substantially free of emissions, the gas turbine cycle comprising a compressor, a combustion chamber arranged downstream of the compressor, a gas turbine arranged downstream of the combustion chamber, a heat-recovery boiler arranged downstream of the gas turbine, a hot-gas path between the gas turbine and the heat-recovery boiler, an exhaust-gas path downstream of the heat-recovery boiler, and at least one generator coupled to the gas turbine;
first means for alternatively or additionally allowing hot gas to be fed into said hot-gas path; and
second means for alternatively or additionally allowing exhaust gas to be expelled from the exhaust-gas path .
2. (Previously Presented) The power generation plant as claimed in claim 1, wherein the first means and the second means each comprise switch-over members which allow feeding-in or expelling gas.
3. (Previously Presented) The power generation plant as claimed in claim 1, further comprising:
at least one auxiliary burner configured and arranged to supply the hot gas to be alternatively or additionally fed into the hot-gas path.
4. (Previously Presented) The power generation plant as claimed in claim 1, wherein the gas turbine cycle comprises a CO₂/H₂O gas turbine cycle capable of producing CO₂ and H₂O, and further comprising:
means for removing CO₂ and H₂O including means for compression, means for cooling, or both; and
means for supplying the gas turbine cycle with substantially pure oxygen.

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5. (Previously Presented) The power generation plant as claimed in claim 20, wherein the air separation plant comprises a cryogenic plant or a diaphragm-based process plant.

6. (Previously Presented) The power generation plant as claimed in claim 1, wherein said compressor, said combustion chamber, and said gas turbine together comprise a gas turbine plant;

wherein the steam turbine cycle is substantially closed and includes at least one steam turbine and at least one generator coupled to the at least one steam turbine; and

wherein the steam turbine cycle, when solely hot gas is fed in via the first means and when gas is simultaneously expelled via the second means, is configured and arranged to be operated so that the at least one generator of the steam turbine cycle generates sufficient energy to:

put said gas turbine plant and an optional air separation plant into operation, or

operate as an emergency generating unit in the event of a failure of said gas turbine plant.

7. (Previously Presented) The power generation plant as claimed in claim 6, further comprising:

a switch-over member, via which ambient air can be drawn in, arranged upstream of the compressor.

8. (Previously Presented) The power generation plant as claimed in claim 1, wherein the steam turbine cycle comprises a bottoming steam turbine.

9. (Previously Presented) The power generation plant as claimed in claim 1, wherein the steam turbine cycle comprises a topping steam turbine that produces partly expanded exhaust

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steam; and

wherein the steam turbine cycle is configured and arranged to inject said partly expanded exhaust steam into the gas turbine cycle medium upstream of, in, downstream of, or combinations thereof, the combustion chamber and thereafter expand said partly expanded exhaust steam to ambient pressure in the gas turbine to deliver power.

10. (Previously Presented) A method of starting up a power generation plant as claimed in claim 1, the method comprising:

in a first phase, putting into operation the steam turbine cycle with hot gas fed in via the first means, while simultaneously the exhaust gases are at least partly expelled via the second means;

in a second phase, motor-driving the at least one generator of the gas turbine cycle with current from a generator arranged in the steam turbine cycle in order to start up a turboset comprising the compressor, the combustion chamber, and the gas turbine;

drawing in fresh air or a combustion-gas mixture with the compressor via an air flap arranged upstream, via the second means opened in both directions, or both; and

delivering the fresh air or a combustion-gas mixture through the combustion chamber in which fuel is fired, so that the turbine starts to assist the at least one motor-driven generator and finally serves as sole drive;

wherein the hot exhaust gases of the gas turbine progressively take over steam generation in the heat-recovery boiler, until said hot exhaust gas completely takes over steam generation in the heat-recovery boiler.

11. (Previously Presented) A method of starting up a power generation plant as claimed in claim 1, the method comprising:

in a first phase, putting into operation the steam turbine cycle with hot gas fed in via the first means, while simultaneously the exhaust gases are at least partly expelled via the second means;

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after a turboset comprising the compressor, the combustion chamber, the gas turbine, and the at least one generator, is running in a self-sustaining manner, operated with air as a substitute medium via an air flap arranged upstream of the compressor, in a second phase, closing the gas turbine cycle via the first means and the second means and the air flap;

feeding substantially pure oxygen as an oxidizing agent to the combustion chamber;

expelling gas continuously from the gas turbine cycle in order to compensate for the feed of oxygen and fuel;

wherein the composition of circulating gas progressively approaches an equilibrium; and

when said equilibrium is reached, starting the separation and liquefaction of the combustion products.

12. (Previously Presented) The method as claimed in claim 11, wherein the gas turbine cycle is a CO₂/H₂O gas turbine cycle, and further comprising:

starting the separation and liquefaction of excess carbon dioxide by compressing the carbon dioxide in a compressor to a pressure required for further use; and

drying and liquefying the excess carbon dioxide in a cooler.

13. (Previously Presented) The method as claimed in claim 10, further comprising:

at least partly using the current available after the first phase from the steam turbine cycle generator for operating an air separation plant, for providing substantially pure oxygen for the combustion process in the combustion chamber.

14. (Previously Presented) The method as claimed in claim 10, , further comprising:

during or after the first phase, making available a large proportion of the start-up output in the form of heat by auxiliary burners.

15. (Previously Presented) A method of operating a power generation plant as claimed in claim 1, the method comprising:

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when the gas turbine cycle is not operating, operating only the steam turbine cycle by feeding-in hot air with the first means and by expelling exhaust gases with the second means; and

providing current with the steam turbine cycle generator.

16. (Previously Presented) The power generation plant as claimed in claim 2, wherein the switch-over members comprise resetting air flaps.

17. (Previously Presented) The power generation plant as claimed in claim 3, further comprising:

a blower configured and arranged to supply said at least one auxiliary burner with fresh air.

18. (Previously Presented) The power generation plant as claimed in claim 4, wherein the means for removing branches off directly downstream of the compressor.

19. (Previously Presented) The power generation plant as claimed in claim 18, wherein the means for removing comprises means for removing the CO₂ and H₂O in a liquid form, a supercritical form, or both.

20. (Previously Presented) The power generation plant as claimed in claim 4, wherein the means for supplying substantially pure oxygen comprises an air separation plant.

21. (Previously Presented) The power generation plant as claimed in claim 9, wherein the gas turbine cycle further comprises a cooler, and wherein the steam turbine cycle comprises a switch-over member configured and arranged to direct the partly expanded exhaust steam past the gas turbine into the cooler directly for liquefaction.

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22. (Currently Amended) The method as claimed in claim 10, ~~wherein delivering~~ further ~~comprises comprising~~:
additionally feeding additional, substantially pure oxygen to the combustor.
23. (Previously Presented) The method as claimed in claim 11, further comprising:
at least partly using the current available after the first phase from the steam turbine cycle generator for operating an air separation plant, for providing substantially pure oxygen for the combustion process in the combustion chamber.
24. (Previously Presented) The method as claimed in claim 11, further comprising:
during or after the first phase, making available a large proportion of the start-up output in the form of heat by auxiliary burners.
25. (Previously Presented) The method as claimed in claim 15, wherein providing current comprises providing as an emergency generating unit.